

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of MUSA et al.	Attorney Docket # 1861D
Serial #	Examiner: Paul Michl
Filing Date:	Group Art Unit: 1714
Title: Die Attach Adhesives with Vinyl Ether and Carbamate or Urea Functionality	Date of this paper: 07 August 2001

Assistant Commissioner of Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Kindly enter the following amendments to the application.

IN THE SPECIFICATION:

Change the Title to:

**DIE ATTACH ADHESIVES WITH VINYL ETHER
AND UREA FUNCTIONALITY.**

After the Title and before the Field of the Invention add: "This application is a divisional of application serial number 09/573,303."

Delete from the Field of the Invention the words: "either carbamate, thiocarbamate or".

Change the Abstract of the Invention to read: "Compounds with both vinyl ether and urea functionality are suitable for use in microelectronics applications."

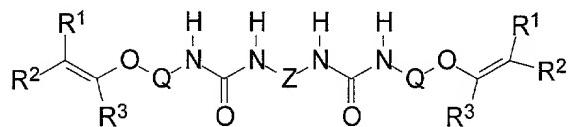
IN THE CLAIMS:

Cancel claims 1 to 5 and 8.

Amend claims 6 and 7 and add new claim 9 as follows:

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6. [A] The vinyl ether compound according to claim 9 having the structure:



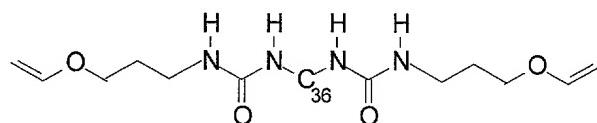
in which

R^1 , R^2 , and R^3 are independently hydrogen, a methyl group, or an ethyl group;

Q is an alkyl or alkyleneoxy linear or branched chain having 1 to 12 carbon atoms;

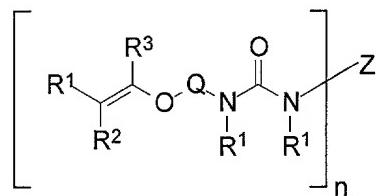
Z is a branched or linear alkane, which may contain cyclic moieties, a siloxane, a polysiloxane, a C_1 to C_4 alkoxy-terminated siloxane or polysiloxane, a polyether, a polyester, a polyurethane, a poly(butadiene), or an aromatic, polycyclic, or heterocyclic group.

7. The vinyl ether compound according to claim [5] 9 having the structure



in which C_{36} is a mixture of isomers of a 36 carbon linear or branched chain.

9. (new) A vinyl ether compound having the structure:



in which

n is 1 to 6;

R¹, R², and R³ are hydrogen, methyl or ethyl;

Q is an alkyl or cycloalkyl linear or branched chain having 1 to 12 carbon atoms; an alkylenoxy chain having 1 to 12 carbon atoms, or aromatic or fused aromatic ring having 3 to 10 carbon atoms and optionally containing the heteroatoms O, N or S;

Z is a branched or linear alkane, which may contain cyclic moieties, a siloxane, a polysiloxane, a C₁ to C₄ alkoxy-terminated siloxane or polysiloxane, a polyether, a polyester, a polyurethane, a poly(butadiene), or an aromatic, polyaromatic, or heteroaromatic group.

REMARKS

Included with this Amendment are a marked-up version and a clean version of the changed specification pages and a clean version of the claims now in this case.

Respectfully submitted


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SPECIFICATION PAGE
MARKED-UP VERSION SHOWING CHANGES MADE

Patent # 1861 D

DIE ATTACH ADHESIVES WITH VINYL ETHER AND

~~CARBAMATE OR UREA FUNCTIONALITY~~

insert 5 > This application is a divisional of application serial number 09/573,303.

FIELD OF THE INVENTION

~~COMPOUNDS~~

This invention relates to ~~die attach adhesives containing resins that~~

contain both vinyl ether and ~~either carbamate, thiocarbamate or urea~~

functionality, and to ~~adhesives containing those compounds.~~

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BACKGROUND OF THE INVENTION

Adhesive compositions, particularly conductive adhesives, are used

for a variety of purposes in the fabrication and assembly of semiconductor

packages and microelectronic devices. The more prominent uses are the

bonding of integrated circuit chips to lead frames or other substrates, and the

15 bonding of circuit packages or assemblies to printed wire boards.

There exist electron acceptor/donor adhesives that contain vinyl ethers as the donor compounds for use in low modulus adhesives,

particularly in fast-cure adhesives for die attach applications. However, die attach adhesives containing commercially available vinyl ethers frequently

20 suffer from poor adhesion, resin bleed and voiding due to the volatility and non-polar nature of these commercial vinyl ethers. Thus, there is a need for improved die attach adhesives utilizing vinyl ethers containing polar functionality in order to address these performance issues.

SUMMARY OF THE INVENTION

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This invention relates to die attach adhesive compositions containing

resins that have vinyl ether and polar functionality, such as a carbamate,

thiocarbamate or urea functionality, on a molecular (small molecule) or

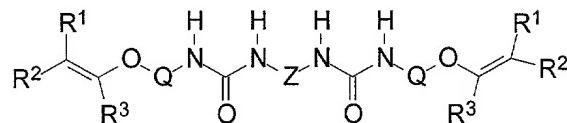
SPECIFICATION PAGE
MARKED-UP VERSION SHOWING CHANGES MADE

ABSTRACT OF THE INVENTION

Compounds with both vinyl ether and ~~carbamate, thiocarbamate or~~
urea functionality are suitable for use in microelectronics applications ~~and~~
5 ~~show enhanced adhesive strength compared to compounds that do not~~
~~contain carbamate, thiocarbamate or urea functionality.~~

CLAIMS
MARKED-UP VERSION SHOWING CHANGES MADE

The *according to claim 9*
6. ~~X~~ vinyl ether compound having the structure:



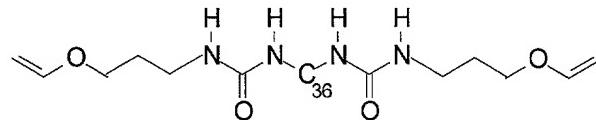
in which

R^1 , R^2 , and R^3 are independently hydrogen, a methyl group, or an ethyl group;

Q is an alkyl or alkylenoxy linear or branched chain having 1 to 12 carbon atoms;

Z is a branched or linear alkane, which may contain cyclic moieties, a siloxane, a polysiloxane, a C_1 to C_4 alkoxy-terminated siloxane or polysiloxane, a polyether, a polyester, a polyurethane, a poly(butadiene), or an aromatic, polyaromatic, or heteroaromatic group.

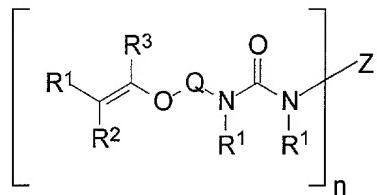
7. The vinyl ether compound according to claim ~~X~~ having the structure



in which C_{36} is a mixture of isomers of a 36 carbon linear or branched chain.

new

9. A vinyl ether compound having the structure:



in which

n is 1 to 6;

R¹, R², and R³ are hydrogen, methyl or ethyl;

Q is an alkyl or cycloalkyl linear or branched chain having 1 to 12 carbon atoms; an alkylenoxy chain having 1 to 12 carbon atoms, or aromatic or fused aromatic ring having 3 to 10 carbon atoms and optionally containing the heteroatoms O, N or S;

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